



# A new species of *Marginella* (Mollusca, Gastropoda) from the Italian Pliocene

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**KEY WORDS:** Mollusca, Gastropoda, Marginellidae, *Marginella*, new species, Pliocene, Tuscany, Italy.

**ABSTRACT:** A new species of *Marginella*, *M. misae* sp.nov., is described for the Lower Pliocene of Ciuciano (Siena). The species can be distinguished from *M. aurisleporis* (Brocchi, 1814), the only Pliocene Italian similar species, in being more globose and with the external lip considerably less thickened, lacking the labial crenulations observable on *M. aurisleporis*. These two large taxa are probably phylogenetically related to West African marginellids of the *M. glabella*-group.

**RIASSUNTO:** Si descrive una nuova specie di *Marginella* (*M. misae* n.sp.) del Pliocene inferiore di Ciuciano (Siena). A confronto con *M. aurisleporis* (Brocchi, 1814), l'unica altra specie di *Marginella* nota per il Pliocene italiano, la nuova specie differisce per la forma più globosa e meno allungata, con il labbro esterno munito di un orlo più sottile, poco calloso, non crenulato, e con l'apertura più espansa nella parte posteriore. Sono stati confrontati statisticamente i principali caratteri delle due specie, rilevati su 14 esemplari di *M. misae* provenienti tutti dalla località tipo e 33 esemplari di *M. aurisleporis* provenienti prevalentemente da Orciano Pisano (31 esemplari). Sebbene non si possa escludere che *M. misae* sia una forma ecologica di *M. aurisleporis*, le differenze morfologiche ci sembrano tali da giustificare una separazione specifica. *M. misae* e *M. aurisleporis* sono state infine confrontate con le due specie attuali dell'Africa occidentale più prossime alle specie fossili e cioè *M. desjardini* Marche-Marchad, 1957 e *M. sebastiani* Marche-Marchad & Rosso, 1979.

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## INTRODUCTION

In 1814 Brocchi described and figured (Plate 4, Fig. 11) a large species of *Marginella* s.s. as *Voluta auris leporis* from Parlascio, Tuscany. An excellent photo of the holotype preserved in the paleontological collection of the Milan Museum has been published by ROSSI RONCHETTI (1955: Fig. 148) and PINNA & SPEZIA (1978: Plate 61, Fig. 3/3a). *Marginella aurisleporis* is obviously phylogenetically linked to a group of large-sized species at present distributed in West Africa (*Marginella glabella*-group: BUEY SUAREZ, 1980). *Marginella aurisleporis* seems to have been typically associated to deep-sea outer shelf/upper slope assemblages inhabiting fine-grained sediments and has been recorded from a number of Italian localities from Emilia to Sicily (e.g., Castell'Arquato, Piacenza: COCCONI, 1873; Tabiano Bagni, Parma: COCCONI, 1873 and PELOSIO, 1966; Campore, Parma:

unpublished data; Orciano Pisano, Pisa: SEGUENZA, 1875 and MENESINI, 1977; Val d'Era and Livorno: SEGUENZA, 1875; Castelnuovo Berardenga Scalo, Siena: CUSCANI POLITI, 1978; Monte Mario, Roma: SEGUENZA, 1875; Altavilla, Palermo: SEGUENZA, 1875) and Spain (Malaga: GLIBERT, 1960; VERA-PELÁEZ *et al.*, 1996). *M. aurisleporis* is only known from lower Pliocene deposits and likely belongs to a stock of tropical/sub-tropical taxa which do not survive the mid-Pliocene cooling of the Mediterranean basin (e.g., RAFFI & MARASTI, 1982; RAFFI *et al.*, 1989; LE RENARD *et al.*, 1996). The species is also reported for Miocene by MALATESTA (1974) and CUSCANI POLITI (1978), but these records need confirmation.

*M. aurisleporis* has been long considered as the only representative of this genus in the Mediterranean Pliocene. A strictly allied taxon has been recently identified in the lower Pliocene of Tuscany and is here described based on 14 shells collected from Ciuciano, Siena (Fig.1).

## SYSTEMATICS

|              |                                 |
|--------------|---------------------------------|
| Ordo         | Neogastropoda Thiele, 1929      |
| Superfamilia | Muricoidea Rafinesque, 1815     |
| Familia      | Marginellidae Fleming, 1828     |
| Genus        | <i>Marginella</i> Lamarck, 1799 |

*Marginella misae* n.sp. (Plate 1, Fig. 1-13)

## Diagnosis:

Shell moderately solid, with a short spire. The shell consists of

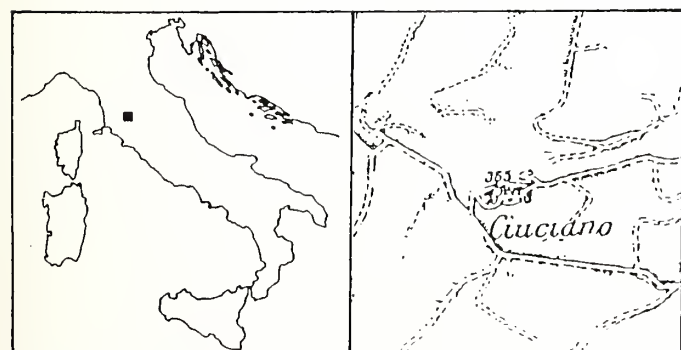
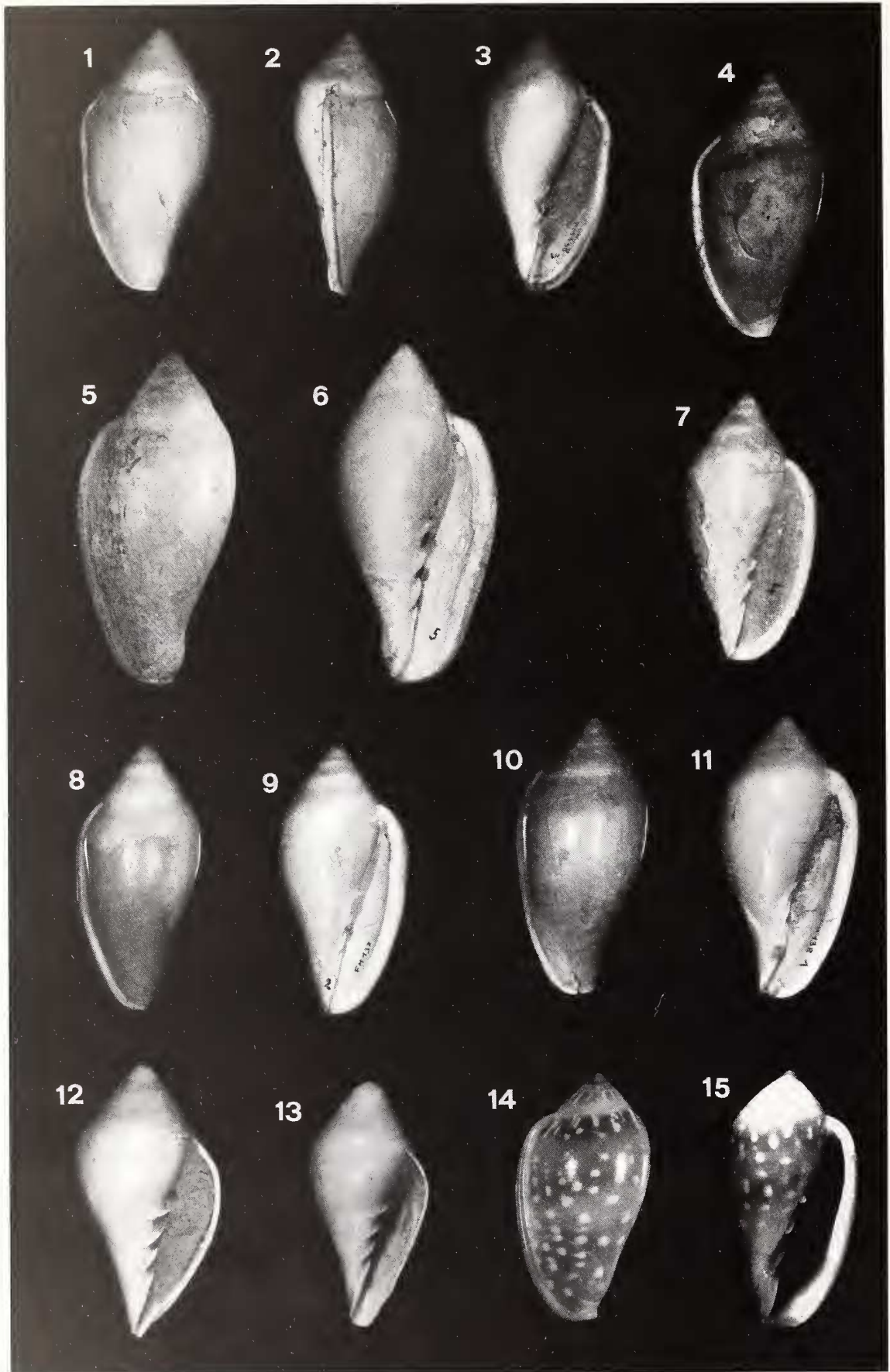


Fig. 1 - Location of the type locality



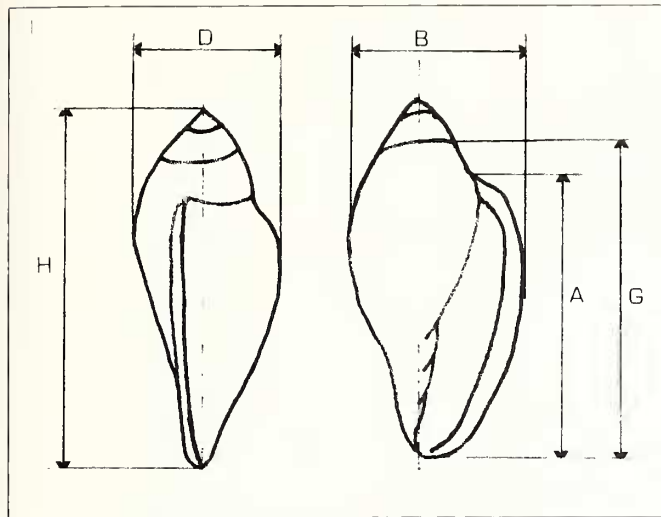


Fig. 2 - Morphological features considered

H = total height; G = last whorl height; A = aperture height; B = total width; D = maximum diameter

4-5 whorls; the upper whorls show a conical profile. The body whorl occupies about 9/10 of the total height. The penultimate and last whorls are obtusely angled near the anterior suture. The last whorl has an elongated-ovoid profile, posteriorly more inflated, anteriorly narrower, with distant growth lines. Outer lip thickened, smooth, posteriorly expanded, without teeth. There are four strong, oblique and regularly spaced columellar folds; the adapical one is the biggest and less oblique. Dimensions of the shell: maximum height 61 mm, width 30.5 mm.

### Etymology:

This species is named after Misa, daughter of Maurizio Forli.

### Type material

Holotype (Zoological Museum of Bologna University, ZMB n. 12700, pl.1, Fig. 1-3), Paratype 1 (Zoological Museum of Bologna University, ZMB n. 12701, pl.1, Fig. 4,7), Paratype 2 (M.Forli collection, n. F310A/1, pl.1, Fig. 5-6), Paratype 3 (M.Forli collection, n. F310A/2, pl.1, Fig. 8-9), Paratype 4 (B.Dell'Angelo collection, n. FX20A, pl.1, Fig. 10-11).

### Other material

9 shells, all from the type locality.

### Type locality

Ciuciano, near S. Gimignano, Siena province, Tuscany (Italy); Sheet 113 III NO (S.Gimignano), of Carta Topografica d'Italia (1942).

## DISCUSSION

*M.misae* is similar to *M.aurisleporis* (Plate 2, Fig. 1-11). From the latter the new taxon differs in being more globose because of the proportionally more inflated upper third of the last whorl. Furthermore, the external lip is considerably less thickened and completely smooth, lacking the labial crenulations observable on *M.aurisleporis*. Macroscopically, such morphological differences are quite evident and have been analyzed for their statistical consistency. We have compared the main morphological features of both taxa (Fig.2) and the results are reported in Fig. 3-4 and Tab. 1.

The shell figured by MALATESTA (1974: Plate 28, Fig. 5ab) as *M.aurisleporis* from the Pliocene of Santa Maria (Umbria) seem instead to belong to *M.misae*.

The new species is also close to the Recent West African *Marginella sebastiani* Marche-Marchand & Rosso, 1979 (Plate 1, Fig.

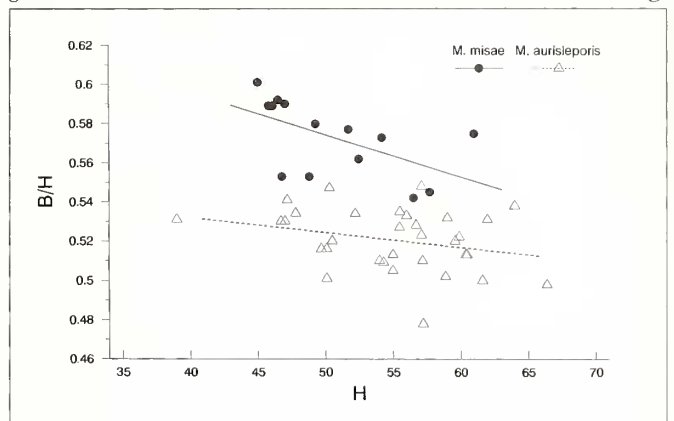


Fig. 3 - Comparison between dispersion diagrams and regression lines B/H-H

14-15) and *M.desjardini* Marche-Marchand, 1957 (Plate 2, Fig. 13-14), that are, however, both characterized by a crenulated labial margin and an impressed posterior lip.

## DISTRIBUTION

The new species is thus far known only from the type locality and its stratigraphical range seems at present to be limited to the Lower Pliocene of Tuscany and Umbria.

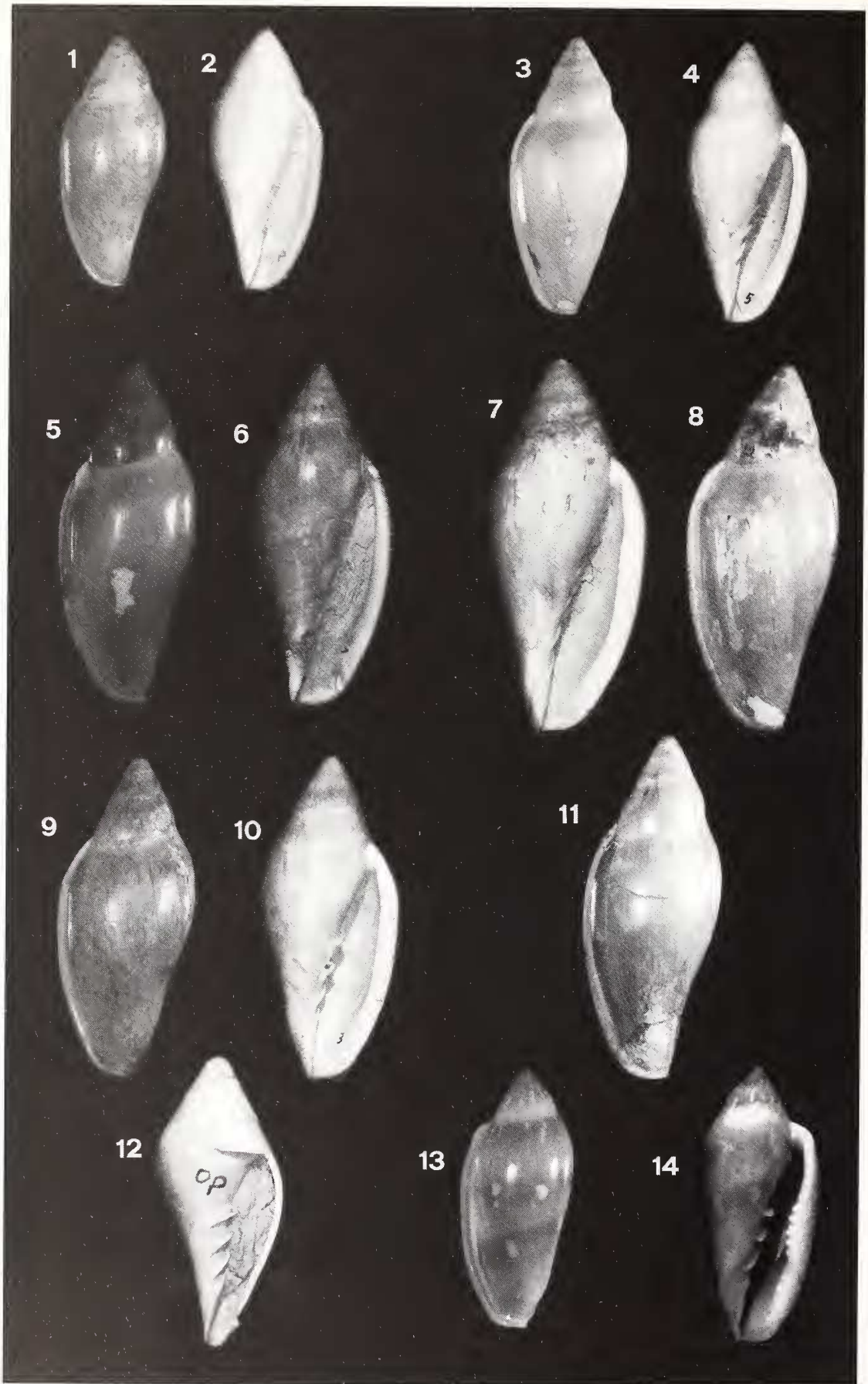
## ECOLOGY

According to the available evidence, *M.misae* probably inhabited fine-sandy bottoms at shallower depths than *M.aurisleporis*.

## CONCLUSIONS

Two allied species of *Marginella* s.s. are represented in the Mediterranean Pliocene, i.e. *M.aurisleporis* (Brocchi, 1814) and *M.misae* n.sp. These two large taxa are probably phylogenetically

← Plate 1: Fig. 1,2,3 *Marginella misae* – holotype, height 46,1 mm - Fig. 4,7 *Marginella misae* - paratype 1, height 46,5 mm - Fig. 5,6 *Marginella misae* - paratype 2, height 57,7 mm - Fig. 8,9 *Marginella misae* - paratype 3, height 46,8 mm - Fig. 10,11 *Marginella misae* - paratype 4, height 48,8 mm - Fig. 12 *Marginella misae* – juv. (Ciuciano) height 21 mm - Fig. 13 *Marginella misae* – juv. (Ciuciano) height 18,5 mm - Fig. 14,15 *Marginella sebastiani* - Senegal (height 42,7 mm)





TAB. 1 - Comparison of the main morphological features of both taxa

| Features | <i>Marginella misae</i> n. sp<br>n = 14 |                       |             | <i>Marginella aurisleporis</i> (Brocchi, 1814)<br>n = 33 |                       |             | Mann<br>Whitney<br>test | P value |
|----------|---|-----------------------|-------------|--|-----------------------|-------------|-------------------------|---------|
|          | Media                                   | Standard<br>deviation | Range       | Media  | Standard<br>deviation | Range       |                         |         |
| H        | 50,64                                   | 5,08                  | 45 - 61     | 54,95  | 5,84                  | 39 - 66,4   | 121,5                   | < 0.01  |
| D        | 20,21                                   | 1,62                  | 17,8 - 23,5 | 19,68  | 1,62                  | 14 - 22,2   | 249                     | N S     |
| G        | 44,40                                   | 4,32                  | 39,5 - 53   | 46,23  | 4,59                  | 32 - 54,8   | 163                     | N S     |
| A        | 41,53                                   | 4,23                  | 36,4 - 50,5 | 41,72  | 4,65                  | 27 - 50     | 211,5                   | N S     |
| B        | 25,41                                   | 2,08                  | 22,7 - 30,5 | 24,07  | 2,27                  | 17 - 27,6   | 300                     | N S     |
| D/H      | 0,40                                    | 0,01                  | 0,38 - 0,42 | 0,36   | 0,02                  | 0,32 - 0,39 | 455                     | <0.0001 |
| G/H      | 0,88                                    | 0,01                  | 0,85 - 0,9  | 0,84   | 0,02                  | 0,8 - 0,88  | 418,5                   | <0.0001 |
| A/H      | 0,82                                    | 0,02                  | 0,78 - 0,86 | 0,76   | 0,03                  | 0,68 - 0,8  | 433,0                   | <0.0001 |
| B/H      | 0,50                                    | 0,02                  | 0,48 - 0,54 | 0,44   | 0,02                  | 0,41 - 0,47 | 462,0                   | <0.0001 |
| D/G      | 0,46                                    | 0,01                  | 0,43 - 0,48 | 0,43   | 0,02                  | 0,4 - 0,46  | 429,0                   | <0.0001 |
| B/G      | 0,57                                    | 0,03                  | 0,54 - 0,6  | 0,52   | 0,02                  | 0,47 - 0,54 | 458,0                   | <0.0001 |

The shells of *M. aurisleporis* studied come from the environs of Orciano Pisano, Pisa (31 spm), Cava di Campore, Parma (1 spm) and Altavilla, Palermo (1 spm).

Due to not-normality of data, the not-parametric test of Mann-Whitney has been used: its applicability is independent from initial hypothesis on type of data distribution.

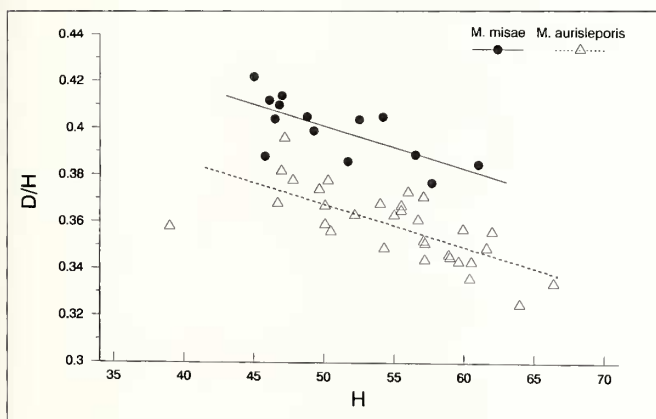


Fig. 4 - Comparison between dispersion diagrams and regression lines D/H-H

related to West African marginellids of the *M. glabella*-group. The fossil taxa show consistent morphological differences in their shells: *M. aurisleporis* is elongated and labial toothed, while *M. misae* is more globose and smooth. Although we cannot rule out that the latter is an ecological form of *M. aurisleporis*, we believe that the observed morphological differences are strong enough to substantiate their specific separation. Both taxa did not survive the Pliocene climatic cooling becoming extinct sometimes in the Pliocene, prior of c. 2.1 m.y, possibly before 3 m.y BP.

## ACKNOWLEDGEMENTS

We are grateful to D. Bertini (Florence), F. Ciappelli (Calenzano, Florence), P. Frediani (Castelfiorentino, Florence) and P. Quadri (Milan) for the material put at our disposal for the study; to I. Nofroni (Rome) and G. Santini (Prato) for the processing of statistical data; to M. Taviani (C.N.R. Bologna) for having reviewed the original manuscript; to L. Casoni (C.N.R. Bologna) for drawings; to E. Ulivi (Florence) for the photos.

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← Plate 2: Fig. 1,2 *Marginella aurisleporis* - height 50,1 mm; Fig. 3,4 *Marginella aurisleporis* - height 50,1 mm; Fig. 5,6 *Marginella aurisleporis* - height 60,4 mm; Fig. 7,8 *Marginella aurisleporis* - height 65,7 mm; Fig. 9,10 *Marginella aurisleporis* - height 57,1 mm; Fig. 11 *Marginella aurisleporis* - height 66,4 mm; Fig. 12 *Marginella aurisleporis* - juv. (Orciano Pisano) height 28,7 mm; Fig. 13,14 *Marginella desjardini* - Senegal (height 50,1 mm)



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